ANNUAL REPORT FOR 2011

Campbell Creek Phase II Mitigation Site
Beaufort County
TIP No. R-2510WM

Natural Environment Unit & Roadside Environmental Unit
North Carolina Department of Transportation
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SUMMARY

The following report summarizes the monitoring activities that have occurred in 2011 at the Campbell Creek Phase II Mitigation Site. The Campbell Creek Phase II site was constructed to provide compensatory mitigation to offset future impacts in the Tar-Pamlico river basin. The 2011-year represents the fifth year of hydrology and vegetation monitoring following construction. The site must demonstrate hydrologic and vegetation success for a minimum of five years or until the site is deemed successful. The project site is located approximately seven miles east of Aurora in Beaufort County immediately adjacent to Tetterton Road.

The site must be monitored for five years following site construction or until success criteria are met. The success of the marsh vegetation component of the wetland site will be determined in accordance with National Marine Fisheries Service guidelines. The site is monitored with sixty vegetation plots and five surface water monitoring gauges. Data analysis includes an examination of all recorded site data as well as an assessment of local climate conditions throughout the growing season.

In April 2007, five surface water gauges were installed to monitor hydrology on the site. Four surface gauges were positioned in the restoration portion of the mitigation site. One surface gauge was installed as a reference gauge within the preservation area.

Hydrologic success criteria are based on the approved mitigation plan and require that the site demonstrate frequent periods of inundation. The surface water gauges will then be compared to the reference gauge to show that the inundation patterns are similar. The 2011-year represents the fifth year of hydrologic monitoring for the Campbell Creek Phase II Mitigation Site. The four surface water gauges were compared to the one reference gauge. The surface water monitoring gauges showed periods of inundation similar to that of the reference gauge during the 2011 monitoring year.

For the vegetation monitoring in the marsh grass area, the target species and scale values were 68.0% and 4.0, respectively. In May 2008 NCDOT supplementally planted the site to increase the coverage of the planted species located on site. Since then, phragmites has been treated on the site in April 2008, October 2008, September 2009, September 2010 and September of 2011. Supplemental plantings that took place in May of 2008 and 2009 were completed to increase plant survival and coverage within the bare areas of the site and the areas where the phragmites was continually being treated. During the 2011 monitoring evaluation, phragmites was noted in some localized areas of the site.

Based on the results from the fifth year of monitoring, NCDOT proposes to discontinue all monitoring activities at the Campbell Creek Phase II Mitigation Site.

INTRODUCTION

1.1 Project Description

The Campbell Creek Phase II site was constructed to provide compensatory mitigation to offset future impacts in the Tar-Pamlico river basin. The project site is located approximately seven miles east of Aurora in Beaufort County. This report details the monitoring activities at the northern property (approximately 11 acres), located immediately adjacent to Tetterton Road.

1.2 Purpose

In order to demonstrate successful mitigation, hydrologic and vegetation monitoring must be conducted for a minimum of five years or until the site is deemed successful. Vegetation success criteria are based on the National Marine Fisheries Service guidelines. Hydrologic success criteria are based on the approved mitigation plan and require that the site demonstrate frequent periods of inundation. The surface water gauges will then be compared to the reference gauge to show that the inundation patterns are similar. Included in this report are analyses of hydrologic and vegetation-monitoring results, discussions of local climate conditions throughout the growing season and site photographs.

1.3 Project History

March 2007	Phase II Site Constructed
April 2007	Phragmites Treated – Phase II
May 2007	Phase II Site Planted
July 2007	Marsh Vegetation Monitoring (Year 1) – Phase II Site
April-December 2007	Hydrologic Monitoring (Year 1) - Phase II Site
April 2008	Phragmites Treated
May 2008	Site Supplementally Planted
August 2008	Vegetation Monitoring (Year 2) - Phase II Site
April-December 2008	Hydrologic Monitoring (Year 2) - Phase II Site
August 2009	Vegetation Monitoring (Year 3) - Phase II Site
September 2009	Phragmites Treated
April-December 2009	Hydrologic Monitoring (Year 3) - Phase II Site

August 2010	Vegetation Monitoring (Year 4) - Phase II Site
September 2010	Phragmites Treated
April-December 2010	Hydrologic Monitoring (Year 4) - Phase II Site
May 2011	Phragmites Treated
June 2011	Vegetation Monitoring (Year 5)
April-December 2011	Hydrologic Monitoring (Year 5)

1.4 Debit Ledger

The Campbell Creek Phase II site is composed entirely of upfront mitigation. If the site is determined to be successful by the Regulatory Agencies, then the mitigation, with approval by the agencies, may be used on future projects in the Tar-Pamlico river basin.

Figure 1. Site Location Map

2.0 HYDROLOGY

2.1 Success Criteria

The hydrologic success criteria established for the Campbell Creek Phase II Mitigation Site, as stipulated in the approved mitigation plan and subsequent revisions, require that the site demonstrate frequent periods of inundation. The surface water gauges will then be compared to the reference gauges to show that the inundation patterns are similar. Groundwater monitoring is not required at this site since it is a wind driven tidal system.

2.2 Hydrologic Description

Wind-driven tides are the primary hydrologic input at the Campbell Creek Phase II Site. Four surface water monitoring gauges were installed within the Phase II site restoration area (SG-6, SG-7, SG-8, SG-9; see Figure 2) in April 2007. There is also one reference gauge (REF-10) located directly adjacent to the constructed site, within the preservation area. The surface gauges record surface water levels every three hours on a daily basis. Monitoring data for 2011 represents the fifth year of hydrologic monitoring for the Phase II site.

2.3 Results of Hydrologic Monitoring

2.3.1 Site Data

Appendix A contains plots of the data at each surface gauge location. The set of plots shows the surface water elevation recorded against the actual gauge elevation surveyed relative to mean sea level. All four of the surface gauges as well as the reference gauges show that the site is demonstrating frequent periods of inundation.

2.3.2 Climatic Data

Precipitation is not the primary hydrologic input for this site and was not included in this report. It is expected that the site would show the required periods of inundation regardless of area rainfall totals.

2.4 Conclusions

The 2011-year represents the fifth year of hydrologic monitoring for the Campbell Creek Phase II Side mitigation site. The four surface water gauges were compared to the one reference gauge. The four surface water monitoring gauges showed periods of inundation similar to that of the reference gauge during the 2011 monitoring year.

NCDOT proposes to discontinue hydrologic monitoring at the Campbell Creek Phase II Mitigation Site.

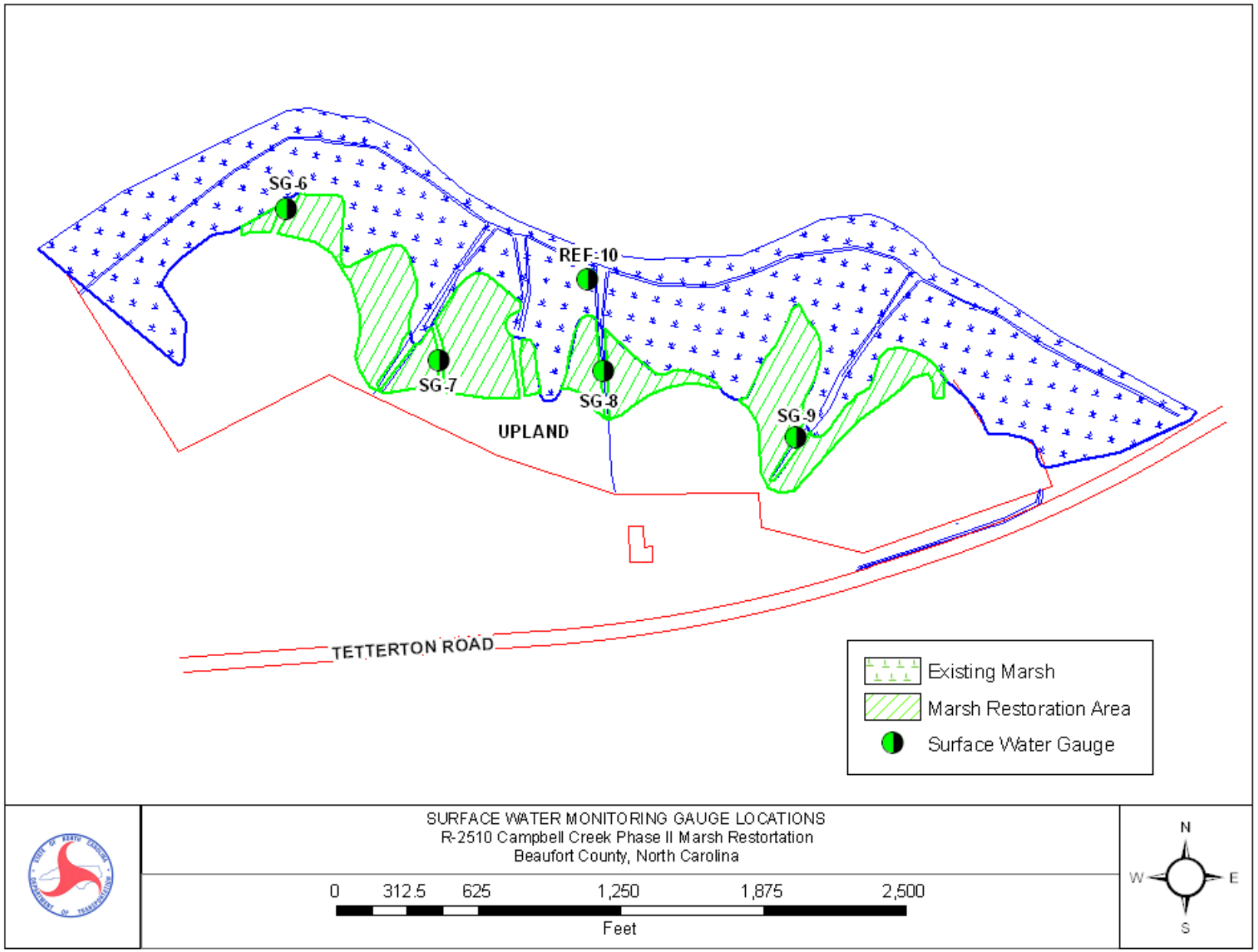


Figure 2. Monitoring Gauge Location Map (Phase II Site)

3.0 VEGETATION: CAMPBELL CREEK PHASE II SITE (YEAR 5 MONITORING)

3.1 Success Criteria

The vegetative marsh success of the wetland site will be determined in accordance with NMFS Guidelines. Monitoring plots found to be located within the open water channel will not be evaluated, and will not count toward the final count of plots. The vegetation component of the wetland site will be deemed successful if the following criteria are met:

1. At year five, the average of all plots should have a scale value of 5 (75% vegetative cover) consisting of wetland herbaceous species, not including any invasive species.
2. A minimum of 70% of the plots shall contain the target (planted) species.

3.2 Description of Species

The following marsh grass species were planted in the Wetland Creation Area:

Cladium jamaicense, Sawgrass

3.3 Results of Vegetation Monitoring

Table 1. Vegetative Monitoring Results

Plot #	Scale Factor	*Cladium jamaicense*	Frequency	Comments
1	3.0			Marsh-elder, *Aster* sp.
2	5.0	☒	☒	*Juncus roemerianus*, saltgrass
3	2.0			*Juncus roemerianus, Aster sp.,* 1% phragmites
4	5.0	☒	☒	
5	0.0			20% phragmites
6	3.0	☒	☒	*Aster* sp.
7	5.0			Cattail
8				Open Water
9				Open Water
10	2.0			*Juncus roemerianus, 1%* phragmites
11	5.0			Cattail, Marsh-elder
12	5.0	☒	☒	Marsh-elder
13	5.0	☒	☒	Marsh-elder, *Juncus roemerianus*
14	4.0	☒	☒	Cattail
15	5.0	☒	☒	Marsh-elder, *Aster* sp, *Scirpus* sp.
16	5.0	☒	☒	*Juncus roemerianus*
17	5.0			*Aster sp., 1% phragmites*
18	5.0			Saltgrass, *Juncus roemerianus, 1% phragmites*
19	5.0	☒	☒	Marsh-elder, *Aster sp.*
20	3.0	☒	☒	Marsh-elder, 2% phragmites
21	5.0	☒	☒	1% phragmites
22	3.0	☒	☒	*Juncus roemerianus*
23	2.0			*Juncus roemerianus*
24	5.0			Marsh-elder, *Aster sp.*
25				Open Water
26	0.0			5% phragmites
27	3.0			Marsh-elder, *Aster sp.*
28	5.0	☒	☒	Marsh-elder
29	5.0	☒	☒	Marsh-elder, Cattail
30	5.0	☒	☒	Marsh-elder
31	5.0	☒	☒	*Juncus roemerianus*
32	5.0	☒	☒	Marsh-elder, *Aster* sp.
33	4.0			*Scirpus* sp.
34	5.0	☒	☒	Marsh-elder
35	5.0	☒	☒	Marsh-elder
36	2.0	☒	☒	*Aster* sp., 1% phragmites
37	5.0	☒	☒	1% phragmites

Plot #	Scale Factor	*Cladium jamaicense*	Frequency	Comments
38	3.0	≈	≈	*Scirpus* sp.
39	5.0	≈	≈	
40	5.0	≈	≈	Marsh-elder
41	5.0	≈	≈	Marsh-elder, *Juncus roemerianus*
42				Open Water
43	3.0			*Scirpus* sp., Marsh-elder
44	0.0			Bare Ground
45	5.0	≈	≈	
46	2.0			*Scirpus* sp.
47	3.0			Marsh-elder
48	5.0	≈	≈	
49	4.0	≈	≈	Marsh-elder, *Aster* sp.
50	5.0	≈	≈	*Scirpus* sp.
51	5.0	≈	≈	
52	4.0			*Scirpus* sp., Marsh-elder, *Aster* sp.
53	5.0	≈	≈	
54	5.0	≈	≈	
55	3.0	≈	≈	
56	3.0	≈	≈	*Juncus roemerianus*
57	5.0	≈	≈	
58	5.0	≈	≈	Marsh-elder, *Aster* sp.
59	2.0	≈	≈	*Aster* sp.
60	4.0	≈	≈	Marsh-elder, Aster sp.
Frequency (Percentage of Plots with Desired Species)			68.0%	
Sum Scale Value			222	
Total Number of Plots			56	
Vegetative Cover (Scale Value)			4.0	

Site Notes: The number of plots the species were found in is listed in parentheses (i.e. 4 of the plots contain cattail) cattail (4), phragmites (10), *Aster* sp. (15), marsh-elder (22), *Scirpus* sp. (7), *Juncus roemerianus* (11), and saltgrass (2).

3.4 Conclusions

Percent Frequency of Target Species **68.0 %**
Frequency of 70% required.

Vegetative Cover Scale Value **4.0**

Scale Value of 5 required for year 5.

The Campbell Creek Phase II sawgrass planting took place during May 2007. Prior to the sawgrass planting, phragmites was treated in April 2007. Since then, phragmites has been treated on the site in April 2008, October 2008, September 2009, September 2010 and September 2011. During the monitoring evaluation, phragmites

was noted in some localized areas of the site. The supplemental plantings that have taken place in May of 2008 and 2009 were completed to increase the plant survival and coverage within the bare areas of the site and the areas where the phragmites is continually being treated.

NCDOT proposes to discontinue vegetation monitoring at the Campbell Creek Phase II Mitigation Site.

4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS

The 2011-year represents the fifth year of hydrologic monitoring for the Campbell Creek Phase II Site. The four surfaced water gauges were compared to the one reference gauge. The surface water monitoring gauges showed periods of inundation similar to that of the reference gauge during the 2011 monitoring year.

For the vegetation monitoring in the marsh grass area, the target species and scale values were 68.0% and 4.0, respectively. The planted vegetation is surviving and continuing to spread throughout the site.

NCDOT proposes to discontinue all monitoring activities at the Campbell Creek Phase II Mitigation Site.

APPENDIX A

GAUGE DATA GRAPHS

APPENDIX B

PHOTO AND VEGETATION PLOT LOCATIONS, SITE PHOTOS

Campbell Creek Phase II

Photo 1

Photo 2

Photo 3

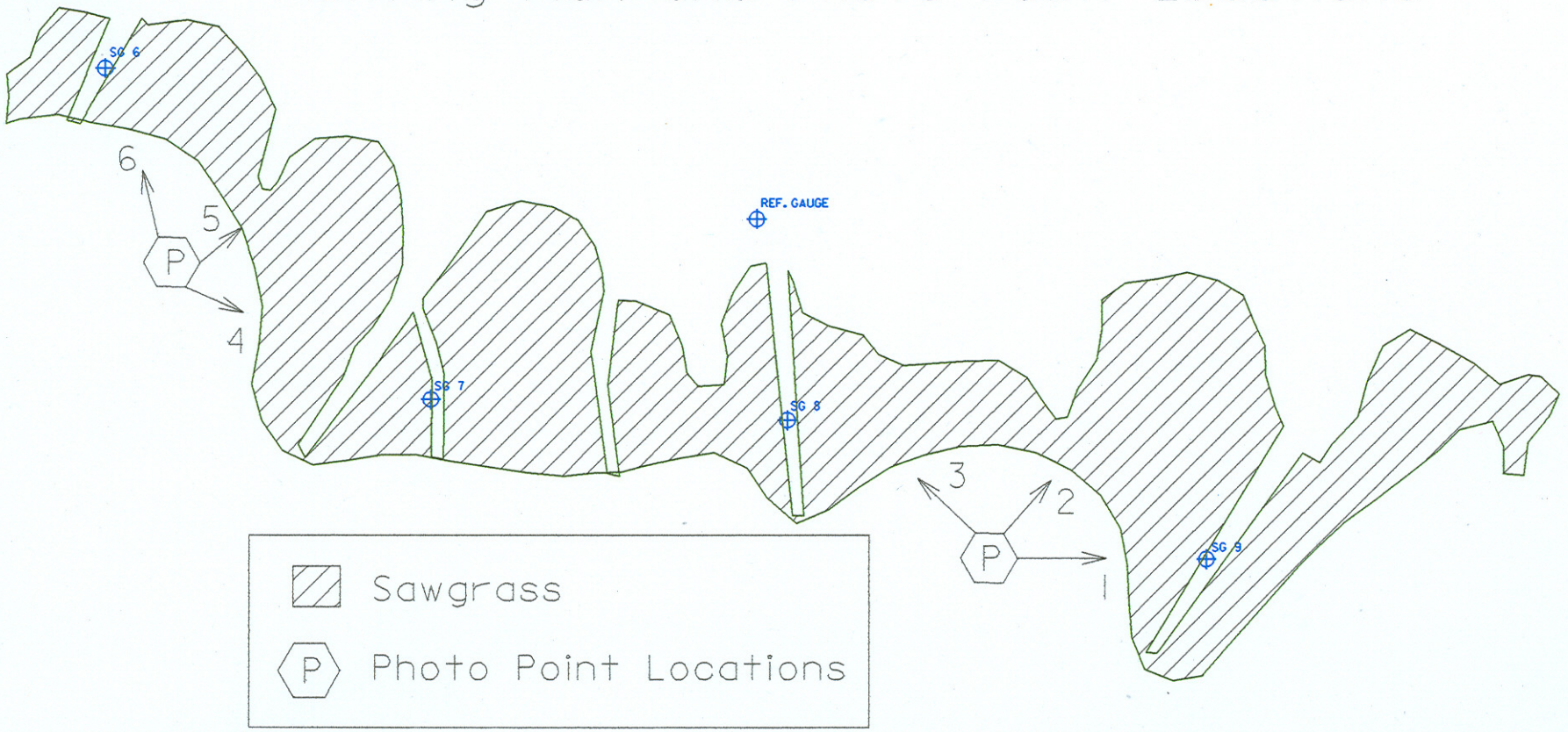
Photo 4

Photo 5

Photo 6

August 2011

Campbell Creek (Phase II - North Side)
Planting Plan and Photo Point Locations



Campbell Creek (Phase II - North Side)
2011 Marsh Grass Random Plots